

# Box Joints on the Tablesaw

Quick, reliable joinery  
with a simple jig

BY LON SCHLEINING

**B**oxes of every imaginable size and material can be assembled with mechanically interlocking box joints that are nearly as strong as the material itself. Box joints are not only reliable and attractive, but they also can be easy to make. They can be cut by hand or with a router, but I prefer to use a simple jig that fits onto my tablesaw crosscut sled. With this easily made accessory, you'll be able to assemble a strong, useful box in as little as an hour.

The same basic jig can be adapted to cut box joints as narrow as  $\frac{1}{8}$  in. or as wide as  $\frac{3}{4}$  in., but I'll concentrate on  $\frac{1}{2}$ -in.-wide joints—a useful size for drawer boxes and small chests.

## Adapting a crosscut sled

My crosscut sled is easily the most useful and frequently used jig in my shop. If you have one already, great. If not, take a look at the model featured in *FWW* #128, pp. 66-69. You'll soon wonder how you ever got along without one. As long as the sled is accurately made and works smoothly, it can be modified to cut box joints.

The rear fence must be substantial, because it will provide a mounting surface for the box-joint jig. To support the jig adequately, the rear fence on your crosscut sled must be secure, at least 5 in. or 6 in. high and square to the sled.

For  $\frac{1}{2}$ -in. box joints, the sled will wind up with a  $\frac{1}{2}$ -in. slot in it, but I'll also show you how to make a plywood insert that will return your sled to its more common uses, making it as good as new.

## Setting up the box-joint jig

I cut box joints no wider than the thickness of the material. The jig shown on the facing page is for cutting  $\frac{1}{2}$ -in. joints, because it's a common and useful size. But  $\frac{1}{2}$  in. is only a starting point— $\frac{3}{8}$ -in.-wide box joints are perfectly fine in  $\frac{3}{4}$ -in. material. The thing to remember is that you'll be building a separate jig for each size. And keep in mind that the narrower the box joint, the longer it takes to cut and more likely accumulating error will cause problems.

To make the jig, start by ripping a clear piece of hard maple for a spacer block. Initially, leave it  $\frac{1}{16}$  in. wider than the size of the joint you're going to make. In this case, the spacer block should be about  $\frac{3}{16}$  in. square and long enough to run through a surface planer safely.

One of the critical adjustments is the width of the dado cut. For cutting box joints, you'll need a good stacked dado set—not the kind that wobbles—that can be reset to the same width easily.

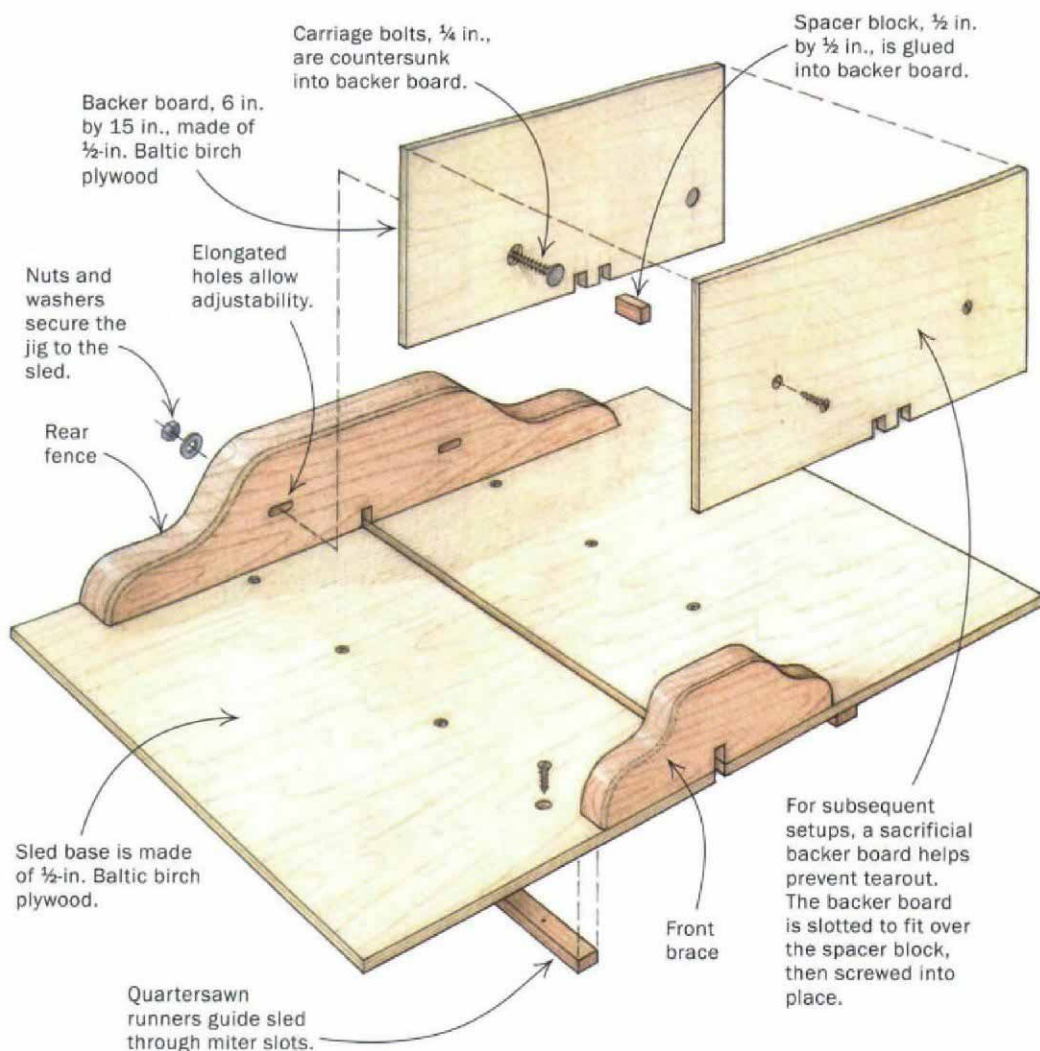
Once the dado is set up, everything else will be adjusted to fit. The width of the dado determines the width of the box joint because both the pin and slot are the same size. As you set up the various blades to cut a ½-in. dado, mark which ones you use and how they are installed so you'll be able to use the same setup next time.

With the dado blades in place, make a new ½-in.-wide slot in the sled. Then you are ready to fit the spacer block. Using the sled, cut a slot in a piece of scrap with the dado, then surface-plane the spacer block until it fits tightly in the slot. Next, you'll need a backer board that will bolt to the rear fence. Set the height of the dado above the sled base to match the thickness of the spacer block. Cut two pieces of ½-in. Baltic birch plywood or equivalent, about 8 in. by 14 in., and then cut ½-in.-deep slots with the dado in the center of both pieces on the longest side. Glue a 2-in. piece of the spacer block into the slot on one of the pieces and set it aside to dry. Make sure the spacer block is square to the backer board, and remove any excess glue while it's still soft. Use ¼-in. carriage bolts to hold the backer board to the sled. Begin by recessing the heads into the birch plywood so they do not protrude. Then drill ¼-in. holes the rest of the way through the plywood.

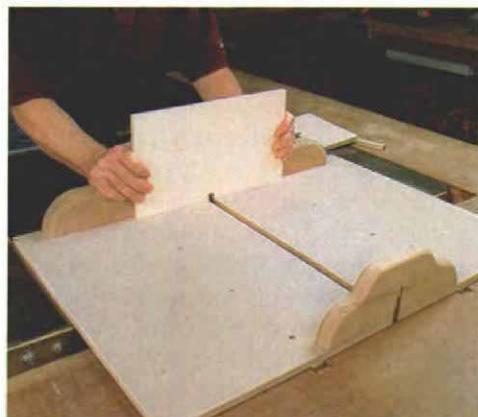
Set the backer board onto the sled so that the spacer block is about ½ in. to the right

## THE BASIC BOX-JOINT JIG

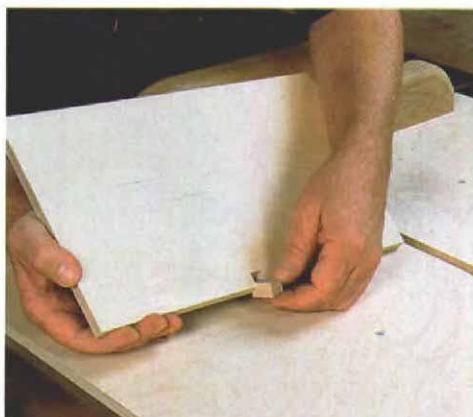
Adding a box-joint jig to a crosscut sled takes only a few bolts and scraps of plywood. This jig is set up to cut ½-in. joints, but the same methods can be used to make jigs for any joint size.



### ATTACHING THE JIG TO A CROSSCUT SLED



**Set up the dado blade.** Use a stacked dado the width of the box joints to cut through the sled. Run a slot through the backer board at the same time.



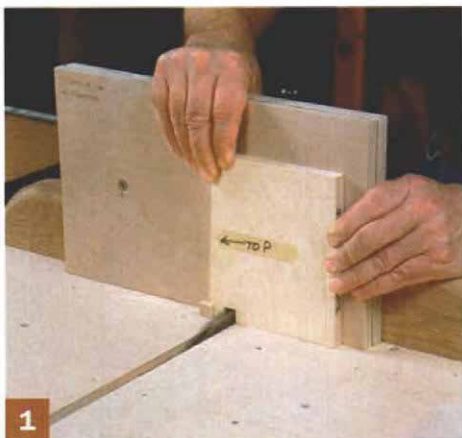
**Glue the spacer block in place.** Take light cuts on a surface planer until the spacer block fits into the slot in the backer board. Then glue a 2-in. length into place and set aside the assembly to dry.



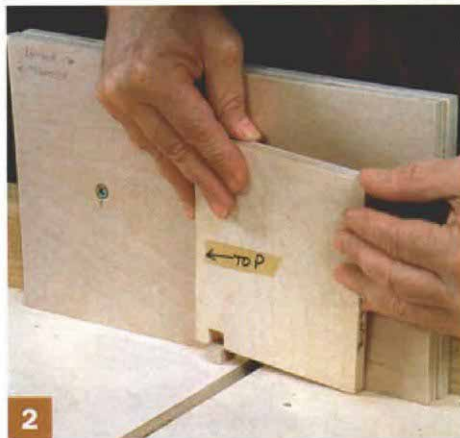
**Adjust the jig.** To find a starting point, use the leftover length of spacer material to locate the spacer block ½ in. to the right of the dado blade, then tighten down the bolts.



## CUT A TEST JOINT AND CHECK THE FIT

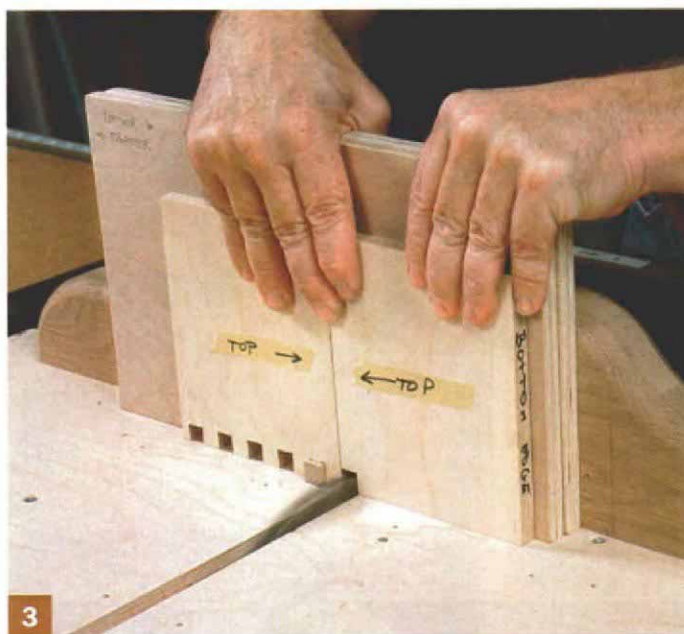


**Make the first cut.** Hold the end piece against the spacer block and backer board, with the top edge facing the spacer block. Cut slowly and remove the piece before returning the sled to the starting position.

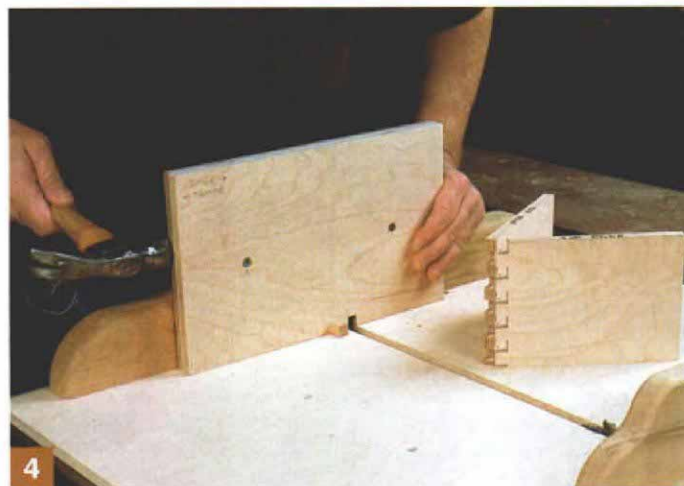


**Continue cutting the joint.** For subsequent cuts, fit the slot over the spacer block and proceed to the end of the piece.

**Make the first cut on the side piece.** Hold the end piece so that its top edge is against the top edge of the side piece. With the end piece fitted over the spacer block, and with its top edge facing the dado blade, position the top edge of the side piece toward the spacer block and continue cutting.



**Check the fit, adjust the jig.** The corner will be too loose, too tight or possibly just right. If it's too loose, move the jig slightly to the left. If it's too tight, move it to the right. Tighten the bolts again, then cut another trial corner joint to make sure it's just right.



of the dado blade and clamp it in place. Mark the locations for the mounting holes in the sled fence by inserting a pencil through the holes in the backer board. Unclamp the backer board and lay out holes  $\frac{1}{4}$  in. to the left and to the right of the marks. Drill two  $\frac{5}{16}$ -in. holes for each bolt and chisel away the wood between the holes. Place flat washers under the nuts, then tighten the nuts just enough to draw the carriage bolts into the backer board.

The beauty of this jig is its adjustability. As a starting point, use a piece of the leftover spacer block to locate the pin exactly  $\frac{1}{2}$  in. to the right of the dado blade, then tighten down the nuts. A few test joints will lead you to the necessary adjustments.

### Cutting box joints with the jig

There are different methods for positioning the pieces with this jig. With the one I suggest, the finished box starts with a full-sized joint on its top edge and leaves any partial joints on the bottom.

Begin by setting the height of the dado blade to about  $\frac{1}{16}$  in. higher than the thickness of the material you're cutting. By setting the height slightly above the thickness, the slots will be deep enough to ensure that the pins will be slightly proud rather than slightly below the surface, allowing you to power-sand the joints flush after the glue dries.

To prevent tearout on the cuts, the extra slotted backer board you cut earlier will serve as a sacrificial backer board. Position the slot over the spacer block and then screw the sacrificial backer to the jig's backer board. Once all of that is done, it's time to try it out.

**Cutting the first joint**—Cut a strip of Baltic birch plywood about 6 in. wide, then crosscut two pieces about 12 in. long and two more about 8 in. long. This will make a box that you'll use to test and adjust the jig.

Mark the top and bottom edges of each of the pieces so you can orient them correctly as you cut. Mark the long pieces as "sides" and the short ones as "ends."

It's important to note that the piece you're cutting always has its top edge facing to the right. Make the first cut with the top of the first end piece facing the right. Hold the piece against the base of the sled and against the backer board, firmly against the spacer block.

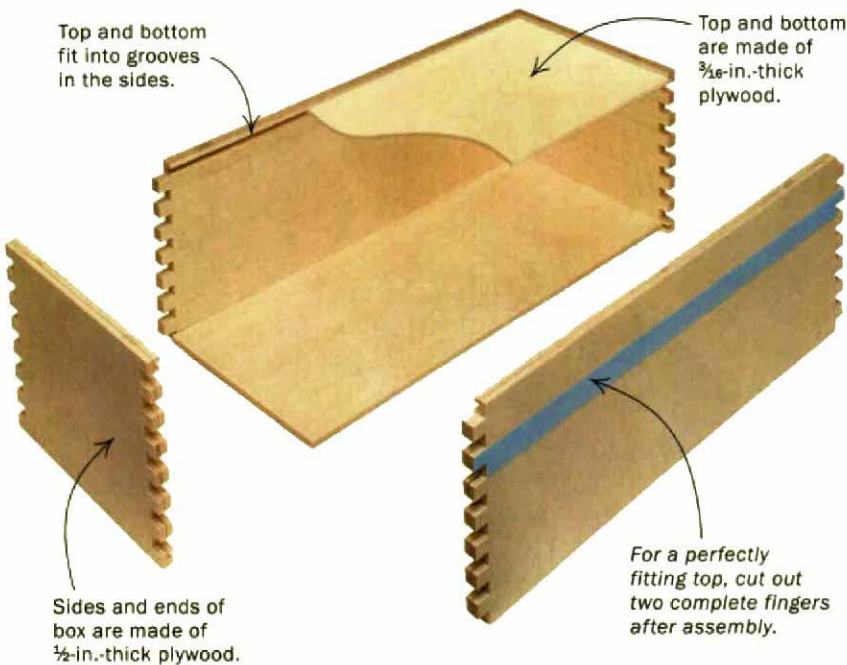
Cut all the way through with the dado



## The 60-minute toolbox

I'm replacing all of my old metal toolboxes with wooden ones. With the box-joint jig, I can make a box in an hour. I start by gluing up an enclosed box, then cut the lid free on the

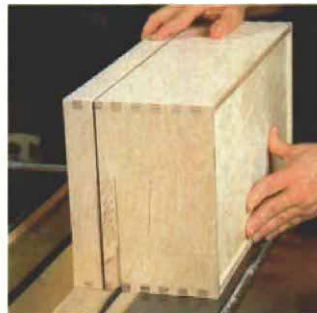
tablesaw. I add an extra inch to the box height so that I can cut away the lid while still maintaining the full width of the pins. After I'm done, I simply add a piano hinge, handle and latches. Using this same technique, I've made boxes ranging in size from a few square inches to more than 5 ft. long.



**Glue up the box.** To speed glue-up, lay out the box parts on a flat surface. Before leaving the assembly, check to see that the box is square, not twisted.



**Fill the void.** The groove for the top and bottom can be filled easily with end-grain plugs of plywood. Once glued in place, you'll have a hard time spotting the fix.



**Cut the lid free.** Adding an extra inch to the box height allows you to keep uniform  $\frac{1}{2}$ -in. pin sizes. Set the blade height just below the thickness of the sides so that the box stays intact during the cutting. Then use a hand-saw to separate the top from the bottom.

blade until the sled hits its stop. Pull the workpiece out of the jig, then return the jig to the starting position. Reposition the end with the slot fitted over the spacer block and make the next cut. Cut slowly to minimize tearout. Continue until all of the slots are cut on the side piece.

**Cuts on the adjacent piece**—The next step is to cut the joints on one of the side pieces. Use the end piece with its box joints already cut to position the side piece on the jig. Place the first slot cut—the one near the top edge of the end piece—over the spacer block so that the top edge faces to the left. Then place the side piece against the edge of the end piece so that they are aligned top edge to top edge.

With these two pieces in place, make the first cut on the side piece. If the pieces are too small or cumbersome, use clamps to hold them in place. Remove the end piece and set it aside. Make the rest of the cuts on

the side piece the way you did the others on the end piece, always firmly placing the piece against the spacer block and firmly down on the sled base and against the backer board.

The two pieces should fit together quite easily—neither too tightly nor too loosely—allowing enough room for glue. If your pieces fit together perfectly, congratulations. But chances are the joint will not fit perfectly at this point. Mark the position of the jig before making any adjustment so you know how far to move it. If the joint is too loose, back off the nuts and move the backer board and spacer to the left just a little. If the joints are too tight, move the spacer just slightly to the right.

To make sure the jig is set correctly, it's always a good idea to run a test corner before you cut the joints on your project. Experiment on scrap until the joints fit as they should. Continue to cut individual test corners until the fit is just right. As you

work with the jig, its operation will become more familiar.

### Putting the sled back to normal use

A sled's narrow sawkerf slot ensures accuracy and safety. The edges of a newly cut slot can be used for measuring and set-up purposes, and being small, nothing gets caught during a cut. Now it seems like we've ruined the sled by cutting a  $\frac{1}{2}$ -in.-wide slot down the middle of it. Fortunately, it's a simple matter to close the gap.

Cut a piece of  $\frac{1}{4}$ -in. Baltic birch plywood to the size of the sled and screw it into place using short countersunk screws. With your normal blade back in the table-saw, cut through the renewed sled base. Mark the plywood inserts with a triangle so you can put them back the same way each time. Now the sled is just like new. □

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